April 28, 2009

SR-87, MP 224 LANDSLIDE
SLOPE MONITORING SUMMARY BY LANDFORM/WALL LOCATION

The following summary discusses the monitoring results by area of interest:

Precipitation Summary

- From March 1, 2009 to April 7, 2009, 0.04 inches of precipitation was recorded on Mt. Ord, located approximately 2.5 miles from the recent landslide.

NB Upper Wall

- Six optical prisms (P01 through P06), measured over 177 days (9/22/08 to 3/18/09), indicate potential vertical movement between -0.05 and -0.06 feet (-0.60 and -0.72 inch) at P03 through P06.

- Two rebar survey monument locations (RB01 and RB02) installed on the surface at the top of the cut slope above the upper wall, measured over 180 days (9/18/08 to 3/17/09), indicate potential lateral movement of 0.06 feet (0.72 inch) and potential vertical movement 0.06 feet (0.72 inch) at RB02.

- One inclinometer (B10) installed above the upper wall indicates no movement to the total depth of the inclinometer casing (50 feet). TDR monitoring results from Terracon indicate no shear in the cable.

- One wire extensometer (WE10) attached to the upper wall indicates no significant movement since monitoring began on 9/18/08.

NB Lower Wall

- Ten optical prisms (P07 through P16), measured over 177 days (9/22/08 to 3/18/09), indicate potential vertical movement between -0.04 and -0.06 feet (-0.36 and -0.72 inch) at P10 through P16.

- One inclinometer (B42) installed below the NB lower wall indicates no movement to the total depth of the inclinometer casing (88 feet). TDR monitoring results from Terracon indicate no shear in the cable.

SB Wall

- Three rebar survey monument locations (RB12 through RB14) installed on the surface above the wall and within the slope and cut areas, measured over 180 days (9/18/08 to 3/17/09), indicate potential lateral movement of 0.10 feet (1.20 inch) at RB13 and potential vertical movement of -0.05 to -0.07 feet (-0.60 to -0.84 inch) at RB12 and RB13.

- Six optical prisms (P17 through P22), measured over 177 days (9/22/08 to 3/17/09), indicate potential vertical movement between -0.07 and -0.08 feet (-0.84 and -0.96 inch) at P17 through P22. No lateral movement exceeding 95% Probable Combined Measurement Error (PCME) of the prisms has been measured.

- One inclinometer (B38) recently installed above the SB wall indicates no movement to the total depth of the inclinometer cable (294'). TDR monitoring results from Terracon indicate no shear in the cable.

- One inclinometer (B40) recently installed above the SB wall indicates no movement to the total depth of the inclinometer casing (236'). TDR monitoring results from Terracon indicate no shear in the cable.

- One wire extensometer (WE1) attached to the top of the SB wall indicates no significant movement. Measurements have indicated insignificant fluctuations since monitoring began on 9/18/08.

- One inclinometer (B37) installed in the graded area north of the SB wall indicates no movement to the total depth of the inclinometer casing (218 feet). TDR monitoring results from Terracon indicate no shear in the cable.

Surficial Slump on SB Slope Near Station 2814

- Two rebar survey monument locations (RB10 and RB11) installed on the surface below the slump, measured over 180 days (9/18/08 to 3/17/09), indicate potential vertical movement between -0.06 and -0.08 feet (-0.72 and -0.96 inch).

Recent Landslide Area

- Prior to the installation of reinforced concrete drilled shafts in the toe of the recent landslide area on 1/28/09, pile displacement rates measured approximately 0.1 inch per day. Since the drilled shafts were installed, the measured pile displacement rates decreased to approximately 0.00 to 0.05 inch per day. Refer to the attached charts.

- Seven rebar survey monument locations (RB03 through RB09) installed on the surface inside and outside the limits of the recent slide, measured over 180 days (9/18/08 to 3/17/09), indicate approximately 48 to 54 inches of lateral movement and -0.82 to -1.34 feet (-6.12 to -16.08 inch) of vertical movement at RB03, RB04, RB06, and RB07. RB08

indicates approximately 76 feet of lateral movement and approximately -17.9 feet of vertical movement.

- Eight inclinometers installed to monitor landslide movements indicate creep-type movement of the slide mass. Six of the eight inclinometer casings sheared and are no longer probed, but three of the six sheared casings (B29, B30, and B31) continue to be monitored with fixed-borehole wire extensometers. Refer to attached inclinometer, TDR, and extensometer plots.

- One Inclinometer (B29) installed in the roadway shoulder sheared to the extent that the probe no longer slides past the shear zone. The probe stopped inside the casing at approximately 17 feet. A fixed wire extensometer was installed at B29 on 1/13/09. Approximately several weeks after the drilled shafts were installed at the toe of the recent landslide; no measurable movement of the extensometer at B29 has been detected.

- One inclinometer (B36) installed above the slide limits indicates no movement to the depth of the inclinometer cable (294 feet). TDR monitoring results from Terracon indicate no shear in the cable.

- One inclinometer (B39) installed above the slide limits initially indicated potential movement of approximately 0.25 inch in the upper 60 feet of the inclinometer casing (total inclinometer monitoring depth, 294 feet). Current monitoring data suggests that no movement has occurred in the past two weeks. TDR monitoring results from Terracon do not indicate shear in the cable.

- Six MAG nail survey locations (MAG01, MAG02, MAG04, MAG05, and MAG06) installed at the roadway shoulder, measured over 180 days (9/18/08 to 3/17/09), indicate potential vertical movement between of -0.07 to 0.15 feet (-0.84 to 1.80 inch), and potential lateral movement of approximately 1.9 to 3.2 inches at MAG04 and MAG05.

NB Embankment Fill

- Three MAG nail locations (MAG10, MAG12, and MAG13) installed in the roadway shoulder, measured over 180 days (9/18/08 to 3/17/09), indicate vertical movement between -0.09 to -0.19 feet (-1.08 to -2.28 inch) at MAG10, MAG12, and MAG13.

- One inclinometer (B32) installed in the roadway shoulder indicates slight lateral movement of approximately 0.10 inch in the upper 19 feet of the inclinometer casing (total casing depth 37').

- Three scribe survey locations near the bottom of the MSE, measured over 91 days (10/6/08 to 1/5/09), indicate no movement exceeding 95% PCME measured over 91 days (10/6/08 to 1/5/09).

APS Transmission Towers

- Eight scribe survey locations on the tower footings, measured over 97 days (11/14/08 to 2/19/09), indicate potential vertical movement between -0.07 to -0.09 feet (-0.84 to -1.08 inch).

Ancient Landslide

- Four inclinometers (B33 through B36, and B41) recently installed over the upper and middle portions of the ancient landslide indicate no definite shears at this time. TDR monitoring results from Terracon indicate no shears in the cables at these locations.